5

farm machinery costs
as a guide to custom rates

spring
1983

PREFACE

As the demand for custom work increases, farmers in Alberta continue to seek information on machinery costs and custom rates. Custom operators want to ensure they are charging enough to cover their costs and farmers hiring custom operators are concerned that a fair price is paid for the work being done.

Since 1975, Alberta Agriculture has annually published this guide to machinery costs. This publication provides current machinery cost information as a basis for negotiating fair custom rates for farm machinery operations. It is also a useful guide for budgeting machinery costs for other purposes. The best decision information, however, is the actual costs for your specific machine. Because of the variability in machinery cost between farms, we strongly urge use of the worksheets (on page 13 and 14) to calculate these costs for your decision.

A custom operator's costs are only one side of the negotiations. Market rates for the 1982 season provide a second reference point. Some alternative approaches to using this information are suggested on page 1. Some points to consider in custom hiring agreements are listed on page 12.

This year it was difficult to estimate the replacement cost of machines. Creative pricing programs at most dealers tended to obscure the real capital cost of equipment. New machine prices are generally the same as in 1982. Some operating costs continue to inflate with the exception of interest rates which have dropped. Consequently, the projected costs for owning and operating equipment in 1983 are slightly lower than in 1982.

We gratefully acknowledge the services of Cal Ausenhus who again conducted the machinery cost survey. Paul Gervais, Gerd Andres and Keith Brown from the Farm Business Management Branch of Alberta Agriculture also contributed to updating this publication. The Market Rate Survey data was provided from a joint-project with Statistics Branch.

We draw your attention to the yellow brochure in the centre of this publication. Our plan is to prepare a Directory of Custom Operators in Alberta for 1984. Your co-operation in contributing to this directory will be appreciated.

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TABLE OF CONTENTS

INTRODUCTION 1

TRACTORS - 2 WHEEL DRIVE 3

TRACTORS - 4 WHEEL DRIVE 4

CULTIVATION EQUIPMENT 5

SEEDING AND SPRAYING EQUIPMENT 6

FORAGE EQUIPMENT 7

COMBINES - SELF PROPELLED & PULL TYPE 9

GRINDERS, MIXERS & DRYERS 10

FARM TRUCKS 11

POINTS TO CONSIDER IN A CUSTOM HIRING AGREEMENT 12

MACHINERY COST WORKSHEET 13

MACHINERY CUSTOM CHARGE WORKSHEET 14

FUEL CONSUMPTION FOR VARYING TRACTOR HORSEPOWER 15

MACHINERY COSTS ASSUMPTION GUIDE 16

"MY EQUIPMENT COSTS" 17

INTRODUCTION

Custom charges for farm operations can be arrived at in two ways:

1) Use the going rate for the job. The commercial market rates are surveyed and reported continuously by the Farm Business Management Branch. Relevant 1982 figures are listed in the "Market Rate" column of the cost tables in the text.

OR

2) Set the rate at a level such that some or all of the costs plus profit are covered.

This publication outlines steps in the buildup of costs incurred by some of the machinery units used in field and livestock operations. These costs are accumulated into a Full Cost + Profit Basis for a custom charge.

ASSUMPTIONS

1) Estimated years of life, annual hours of use and annual repair rates are specified for each class of machine.
2) Interest on average machine investment is charged at 13% per year.
3) Diesel fuel is charged at $.30 per litre, purple gas at $.31 per litre and propane at $.17 per litre.
(Changes in diesel and propane prices can be costed from the litre per hour usage estimates, then applied to total cost per hour).
4) Labor is charged at $7.00 per hour.
5) Profit allowance on tractors only is calculated at 30% of variable cost.
6) Profit allowance on Self-Propelled Machines and Tractor plus Implement Units equals 40% of the sum of variable costs **plus** labor.
7) Calculations follow the procedures and assumptions of the worksheets included on pages 13 and 14.

FIXED COSTS

Hours of annual use have a major effect on fixed costs per hour. Three levels of annual use are listed for tractors and combines, so as to guide realistic custom or rental pricing.

The tractor costs associated with a 600 hour annual use are used in costing out all tractor driven operations. Substitute the 400 or 1000 rates if they are more applicable.

If your annual use figures differ greatly from those listed, use this formula to adjust your Fixed Costs (FC) Per Hour: Your FC/Hr =

$$\frac{\text{Quoted FC/Hr} \times \text{Quoted Annual Use In Hrs.}}{\text{Your Annual Use In Hrs.}}$$

HOW TO USE THE GUIDE

1) If you are a **full-time custom operator**, then use the Full Cost + Profit Basis for estimating a charge. Be sure to adjust fixed costs if your annual hours of use differ much from those quoted. The profit margin can be adjusted to meet the market conditions.

2) If you are doing custom work on a **good neighbor payment basis**, then fixed costs of owning the machine may be ignored since they represent an annual cost incurred whether or not custom work is done. However, the rate should cover all variable costs which include an allowance for repairs. Labor and profit margin can be adjusted to meet each situation.

3) If you plan to do custom work in addition to your own work, so as to partly justify ownership of a larger machine, then the custom charge should cover variable costs, labor, a profit margin **plus** a proportion of fixed costs calculated as follows:

Proportion of Fixed Costs =

$$\frac{\text{Hours of Custom Work}}{\text{Total Annual Hours of Use}} \times \text{Total Fixed Costs}$$

4) If you are renting out machinery, then you will wish to at least cover fixed costs and those variable costs such as lubrication and repairs which may not be already covered by the renter.
5) If you wish to assess a rate for a full operation such as silage making, which requires several machines, then add the hourly costs of each activity, making sure that there is neither omission nor duplication of men and units. Use worksheets on page 13 and 14.
6) The purchase cost estimates are based on average list prices less 10% as of March, 1983 for each class of machine. These represent current **replacement** costs which should be budgeted and charged for, even if you do custom work with older machines, unless the older machine will not do a comparable job.

OTHER CONSIDERATIONS

1) **Favorable or unfavorable working conditions** such as size of job, distance, access, contour, soil type and possible down time, must modify the guide figures. **Per hour** charges allow for some of these situations.
2) Charges per unit of output such as per acre, per bushel or per bale, defined on **work rates per hour**, may be quite different from those quoted. **Per hour charging** overcomes some of these uncertainties.
3) You can adjust the labor charge according to your actual cost of hired work or the opportunity cost of your own labor.
4) If your experience and farm records suggest that other costs and assumptions would suit your situation, then recalculate using the worksheets.
5) **Earlier and faster may be cheaper.**
There are $ penalties attached to late completion of operations. The $ rewards for timely quality work, quickly completed by large machines, is only earned if the support system, including seed and fertilizer supplies and grain trucking, is well organized.
6) Custom hiring is a business arrangement between two parties. Misunderstandings can be avoided by following the guidelines in page 12.

Such factors as tax and equity in farm machinery influence costs, but are not considered here.

OTHER INFORMATION SOURCES

Farm Machinery Costs, Alberta Agriculture, Agdex 825-2, March 1982.
Planning Farm Machinery Costs, Alberta Agriculture, Agri-Fax Leaflet, Agdex 825-5, August 1977.
Fundamentals Of Machine Operation - Machinery Management, John Deere Co., Illinois, 1975.
U.G.G. Grain Growers Manual, Engineering Section.
Know Your Farm Machinery Cost, Alberta Agriculture, Agdex 825-6, April 1980.
Custom Rates Annual Survey Summary - 1982, Alberta Agriculture, Agdex 825-9, March 1983.

TRACTORS - 2 WHEEL DRIVE (2WD)

Years Life = 13
Annual Use = 400, 600*, 1000
Annual Repair Rate = 3% Replacement Cost

2WD PTO HP	Annual Hours Use	Diesel Use	Current Replace Cost	Fixed Cost	Variable Cost Labor Omitted**	Total Cost	Profit Margin 30 % of Var. Cost	Cost + Profit Basis for Custom Charge	Market Rate Survey
		litres/Hr	$	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	1982
40	400	8	17000	6.41	3.61		1.08		$.17 - .22 per PTO HP/HR
	600			4.27					
	1000			2.56					
60	400	13	21000	7.91	5.54		1.66		
	600			5.28					
	1000			3.17					
80	400	17	28000	10.55	7.27		2.18		
	600			7.03					
	1000			4.22					
100	400	22	45000	16.96	9.84		2.95		
	600			11.30					
	1000			6.78					
120	400	28	50000	18.84	12.16		3.65		
	600			12.56					
	1000			7.54					
140	400	32	58000	21.86	13.94		4.18		$.17 - .19 per PTO HP/HR
	600			14.57					
	1000			8.74					
160	400	38	63000	23.74	16.26		4.88		
	600			15.83					
	1000			9.50					
180	400	39	68000	25.62	16.86		5.06		
	600			17.08					
	1000			10.25					

* The 600 Hour Annual Use figure is the typical figure and the basis used for costing tractor-driven operations.

** To avoid duplication, **labor is not charged in the tractor cost calculation.** Labor is included in the cost of tractor plus implement and self-propelled operations listed on Pages 5 to 11.

Years Life = 13
Annual Use = 400, 600*, 1000
Annual Repair Rate = 3% Replacement Cost

TRACTORS - 4 WHEEL DRIVE (4WD)

4WD Engine HP	Annual Hours Use	Diesel Use	Current Replace Cost	Fixed Cost	Variable Cost Labor Omitted**	Total Cost	Profit Margin 30 % of Var. Cost	Cost + Profit Basis for Custom Charge	Market Rate Survey
		litres/Hr	$	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	1982
175	400	34	67000	25.25	15.08		4.52		$.17 - .19 per PTO HP/HR
	600			16.83					
	1000			10.10					
220	400	40	75000	28.26	17.55		5.27		
	600			18.84					
	1000			11.30					
250	400	50	88000	33.16	21.65		6.50		
	600			22.11					
	1000			13.26					
275	400	53	94000	35.42	22.99		6.90		
	600			23.61					
	1000			14.17					
300	400	58	99000	37.31	24.96		7.49		
	600			24.87					
	1000			14.92					
350 ***	400	62	104000	39.19	26.59		7.98		
	600			26.13					
	1000			15.68					
450 ***	400	85	140000	52.76	36.33		10.90		
	600			35.17					
	1000			21.10					

* The 600 Hour Annual Use figure is the typical figure and the basis used for costing tractor-driven operations.

** To avoid duplication, **labor is not charged in the tractor cost calculation.** Labor is included in the cost of tractor plus implement and self-propelled operations listed on Pages 5 to 11.

*** Priced without PTO.

CULTIVATION EQUIPMENT

Years Life = 15

Implement	Tractor HP	Current Replace Cost	POWER UNIT OR SP UNIT Fixed Cost	POWER UNIT OR SP UNIT Variable Cost	IMPLEMENT Fixed Cost	IMPLEMENT Variable Cost	TOTAL Machine Cost	Profit Margin 40% Var Cost + $7 Lab	Full Cost + Profit Basis for Custom Charge *			Market Rate Survey
		$	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	Ac/Hr	$/Acre	1982
PLOWS			Annual Hours Use = 150				Annual Repair Rate = 6% Replace Cost					
3 x 16" 3 Point	60	4200	5.28	5.54	3.96	1.68	[illegible]	5.69	29.14	2.00	[illegible]	$14-20 per Acre
5 x 16" Semi 3 pt	120	8000	12.56	12.16	7.55	3.20	[illegible]	8.94	51.41	3.00	[illegible]	
6 x 18" Trailing	140	10000	14.57	13.94	9.43	4.00	[illegible]	9.98	58.92	4.00	[illegible]	
8 x 16" Trailing	220	12500	18.84	17.55	11.79	5.00	[illegible]	11.82	72.00	6.00	[illegible]	
10 x 18" Trailing	250	14000	22.11	21.65	13.21	5.60	[illegible]	13.70	83.26	7.00	[illegible]	
HD CULTIVATORS W/ MTD HARROWS			Annual Hours Use = 250				Annual Repair Rate = 6% Replace Cost					
14' Single	80	5000	7.03	7.27	2.83	1.20	[illegible]	6.19	31.52	7.00	[illegible]	$3.85-$4.75 per Acre
22' Wing	120	9000	12.56	12.16	5.09	2.16	[illegible]	8.53	47.50	11.00	[illegible]	
31' Wing	160	13500	15.83	16.26	7.64	3.24	[illegible]	10.60	60.57	15.00	[illegible]	
41' Wing	220	19000	18.84	17.55	10.75	4.56	[illegible]	11.64	70.35	20.00	[illegible]	
60' Wing	350	25000	26.13	26.59	14.15	6.00	[illegible]	15.84	95.70	30.00	[illegible]	
FIELD CULTIVATORS W/ MTD HARROWS			Annual Hours Use = 250				Annual Repair Rate = 6% Replace Cost					
16' Single	60	7000	5.28	5.54	3.96	1.68	[illegible]	5.69	29.14	8.50	[illegible]	$2.70 per Acre
22' Wing	80	9000	7.03	7.27	5.09	2.16	[illegible]	6.57	35.12	12.00	[illegible]	
32' Wing	120	11000	12.56	12.16	6.23	2.64	[illegible]	8.72	49.31	17.00	[illegible]	
42' Wing	160	15000	15.83	16.26	8.49	3.60	[illegible]	10.74	61.92	22.00	[illegible]	
DISCS - TANDEM HD			Annual Hours Use = 150				Annual Repair Rate = 6% Replace Cost					
16' Single	100	9500	11.30	9.84	8.96	3.80	[illegible]	8.26	49.16	7.50	[illegible]	$5.50-$6.00 per Acre
24' Wing	140	20000	14.57	13.94	18.87	8.00	[illegible]	11.58	73.95	12.00	[illegible]	
30' Wing	220	23000	18.84	17.55	21.70	9.20	[illegible]	13.50	87.79	16.50	[illegible]	
16' Heavy Offset	140	15000	14.57	13.94	14.15	6.00	[illegible]	10.78	66.44	7.50	[illegible]	
ROTOVATORS			Annual Hours Use = 100				Annual Repair Rate = 6% Replace Cost					
5' Rotor	80	7000	7.03	7.27	9.91	4.20	[illegible]	7.39	42.79	1.50	[illegible]	
6' Rotor	120	10000	12.56	12.16	14.15	6.00	[illegible]	10.06	61.93	2.50	[illegible]	

* Full Cost + Profit Basis for Custom Charge. Includes Labor at $7.00 per Hour.

CULTIVATION, SEEDING AND SPRAYING EQUIPMENT

Implement		Tractor HP	Current Replace Cost	POWER UNIT OR SP UNIT Fixed Cost	POWER UNIT OR SP UNIT Variable Cost	IMPLEMENT Fixed Cost	IMPLEMENT Variable Cost	TOTAL Machine Cost	Profit Margin 40% Var Cost + $7 Lab	Full Cost + Profit Basis for Custom Charge*			Market Rate Survey
			$	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	Ac/Hr	$/Acre	1982
V - BLADE		Life = 15		Annual Hours Use = 150					Annual Repair Rate = 6% Replace Cost				
21'		100	9500	11.30	9.84	8.96	3.80	[illegible]	8.26	49.16	11.00	[illegible]	$3.85-$4.75 per Acre
28'		160	11500	15.83	16.26	10.85	4.60	[illegible]	11.14	65.68	15.00	[illegible]	
42'		250	18000	22.11	21.65	16.98	7.20	[illegible]	14.34	89.28	20.00	[illegible]	
ROD WEEDER WITH MULTIPLEX & HARROWS		Life = 15		Annual Hours Use = 150					Annual Repair Rate = 6% Replace Cost				
24'		100	7000	11.30	9.84	6.60	2.80	[illegible]	7.86	45.40	12.01	[illegible]	$2.70 per Acre
36'		120	10000	12.56	12.16	9.43	4.00	[illegible]	9.26	54.42	16.00	[illegible]	
48'		160	15500	15.83	16.26	14.62	6.20	[illegible]	11.78	71.69	25.00	[illegible]	
HARROWS		Life = 15		Annual Hours Use = 40					Annual Repair Rate = 2% Replace Cost				
Spring Tooth	50'	80	5500	7.03	7.27	19.46	2.75	[illegible]	6.81	50.31	35.00	[illegible]	
	70'	120	7700	12.56	12.16	27.24	3.85	[illegible]	9.20	72.01	45.00	[illegible]	
Harrow Packers	40'	140	12000	14.57	13.94	42.45	6.00	[illegible]	10.78	94.74	25.00	[illegible]	
	70'	180	17000	17.08	16.86	60.14	8.50	[illegible]	12.94	122.52	42.00	[illegible]	
SEED DRILLS		Life = 15		Annual Hours Use = 100					Annual Repair Rate = 2% Replace Cost				
Press Drills	12'	60	12500	5.28	5.54	17.69	2.50	[illegible]	6.01	44.01	5.50	[illegible]	$5.00-$6.00 per Acre
End Wheel	12'	60	7500	5.28	5.54	10.61	1.50	[illegible]	5.61	35.54	5.50	[illegible]	
Hoe Drill	14'	60	12000	5.28	5.54	16.98	2.40	[illegible]	5.97	43.16	6.00	[illegible]	
Zero/Min. Till	12'	60	14000	5.28	5.54	19.81	2.80	[illegible]	6.13	46.55	4.50	[illegible]	
AIR SEEDERS WITH CULTIVATORS		Life = 15		Annual Hours Use = 150					Annual Repair Rate = 3% Replace Cost				
28'		140	30000	14.57	13.94	28.30	6.00	[illegible]	10.78	80.59	15.00	[illegible]	
42'		250	41000	22.11	21.65	38.68	8.20	[illegible]	14.74	112.37	22.00	[illegible]	
SPRAYER (TRAILER)		Life = 15		Annual Hours Use = 50					Annual Repair Rate = 3% Replace Cost				
250 Gallon 55'		60	3700	5.28	5.54	10.47	2.22	[illegible]	5.90	36.40	20.00	[illegible]	$2.00 per Acre
400 Gallon 65'		60	4500	5.28	5.54	12.74	2.70	[illegible]	6.09	39.34	25.00	[illegible]	
SPRAYER (SP)		Life = 10		Annual Hours Use = 100					Annual Repair Rate = 3% Replace Cost				
130 Gallon 54'		60	16000	27.44	4.80			[illegible]	4.72	43.96	40.00	[illegible]	$2.00-2.50 per Acre
1000 Gal 54' Float		160	85000	145.78	25.50			[illegible]	13.00	191.28	85.00	[illegible]	
320 Gallon 45' + 3/4 Ton 4x4		60	17000	29.16	5.10			[illegible]	4.84	46.10	35.00	[illegible]	

* Full Cost + Profit Basis for Custom Charge. Includes Labor at $7.00 per Hour.

FORAGE EQUIPMENT

Implement	Tractor HP	Current Replace Cost	POWER UNIT OR SP UNIT Fixed Cost	POWER UNIT OR SP UNIT Variable Cost	IMPLEMENT Fixed Cost	IMPLEMENT Variable Cost	TOTAL Machine Cost	Profit Margin 40% Var Cost + $7 Lab	Full Cost + Profit Basis for Custom Charge *			Market Rate Survey
		$	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	Ac/Hr	$/Acre	1982
SWATHER (SP)	Life = 15	Annual Hours Use = 100					Annual Repair Rate = 3 % Replace Cost					
16' Forage & Grain + Conditioner	60	22500	31.84	11.24			[illegible]	7.29	57.37	7.00	[illegible]	$4 - 5 per Acre
20' Grain	60	21000	29.72	10.79			[illegible]	7.11	54.61	10.00	[illegible]	
SWATHER (PULL-TYPE)	Life = 15	Annual Hours Use = 100					Annual Repair Rate = 3 % Replace Cost					
15' Grain	40	5200	4.27	3.61	7.36	1.56	[illegible]	4.87	28.67	7.50	[illegible]	
24' Grain	60	6000	5.28	5.54	8.49	1.80	[illegible]	5.73	33.83	12.00	[illegible]	
MOWER	Life = 15	Annual Hours Use = 50					Annual Repair Rate = 2% Replace Cost					
7'	40	2900	4.27	3.61	8.21	1.16	[illegible]	4.71	28.96	3.00	[illegible]	
MOWER CONDITIONER	Life = 15	Annual Hours Use = 100					Annual Repair Rate = 3 % Replace Cost					
14' SP Diesel	70	33000	46.70	15.44			[illegible]	8.97	78.10	7.00	[illegible]	$8.00-10.00 per Acre
9' PTO	60	10000	5.28	5.54	14.15	3.00	[illegible]	6.21	41.17	5.00	[illegible]	
14' PTO	80	13500	7.03	7.27	19.10	4.05	[illegible]	7.33	51.78	6.50	[illegible]	
RAKE	Life = 15	Annual Hours Use = 50					Annual Repair Rate = 2% Replace Cost					
9' Parallel Bar	40	3000	4.27	3.61	8.49	1.20	[illegible]	4.72	29.29	5.00	[illegible]	
FORAGE HARVESTER	Life = 12	Annual Hours Use = 100					Annual Repair Rate = 3 % Replace Cost					
20"	120	13500	12.56	12.16	21.13	4.05	[illegible]	9.28	[illegible]			$90-160 per Hour
26"	180	18000	17.08	16.86	28.17	5.40	[illegible]	11.70	[illegible]			
DUMP WAGON	Life = 15	Annual Hours Use = 100					Annual Repair Rate = 2% Replace Cost					
Small (700 cu ft)		7000			9.91	1.40	[illegible]	0.56	[illegible]			
Large (900 cu ft)		10000			14.15	2.00	[illegible]	0.80	[illegible]			

* Full Cost + Profit Basis for Custom Charge. Includes Labor at $7.00 per Hour.

Implement	Tractor HP	Current Replace Cost	POWER UNIT OR SP UNIT Fixed Cost	POWER UNIT OR SP UNIT Var Cost	IMPLEMENT Fixed Cost	IMPLEMENT Var Cost	TOTAL Machine Cost	Profit Margin 40% Var Cost + $7 Lab	Full Cost + Profit Basis for Custom Charge* Machine Cost			Twine Cost	Total Cost	Market Rate Survey
		$	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	Bale/Hr	$/Bale	$/Bale	$/Bale	1982
BALERS (STANDARD)	Years Life = 10		Annual Hrs Use = 80				Annual Repair Rate = 3% Replace Cost							
Small 14" x 18"	40	9000	4.27	3.61	19.29	3.38	[illegible]	5.59	43.14	÷ 200	0.22 + 0.08			$.25-.30 per Bale
Large 16" x 18"	60	12000	5.28	5.54	25.73	4.50	[illegible]	6.81	54.85	÷ 300	0.18 + 0.08			
LARGE ROUND	Years Life = 12		Annual Hrs Use = 60				Annual Repair Rate = 2% Replace Cost							
800 Lb. Bale	60	9600	5.28	5.54	25.04	3.20	[illegible]	6.29	[illegible]					$3-5 per Bale
1500 Lb. Bale	60	13000	5.28	5.54	33.91	4.33	[illegible]	6.75	[illegible]					
BIG SQUARE	Years Life = 10		Annual Hrs Use = 150				Annual Repair Rate = 3% Replace Cost							
1500-200 Lb.Bale	160	65000	15.83	16.26	74.32	13.00	[illegible]	14.50	[illegible]					
BALE WAGONS	Years Life = 12		Annual Hrs Use = 80				Annual Repair Rate = 3% Replace Cost							
SP 160 Bale Diesel	40	61000	119.33	22.88			[illegible]	11.95	161.16	÷ 400 = 0.40				$.20-.30 per Bale
PULL 142 Bale	80	27000	7.03	7.27	52.82	10.13	[illegible]	9.76	94.00	÷ 300 = 0.31				
PULL 104 Bale	60	19500	5.28	5.54	38.15	7.31	[illegible]	7.94	71.21	÷ 240 = 0.30				
PULL 55 Bale	40	12000	4.27	3.61	23.48	4.50	[illegible]	6.04	48.90	÷ 160 = 0.31				
STACKERS	Years Life = 12		Annual Hrs Use = 80				Annual Repair Rate = 3% Replace Cost							
4 Ton Rectangular	80	20000	7.03	7.27	39.13	7.50	[illegible]	8.71	[illegible]					
8 Ton Rectangular	120	28000	12.56	12.16	54.78	10.50	[illegible]	11.86	[illegible]					

* Full Cost + Profit Basis for Custom Charge. Includes Labor at $7.00 per Hour.

COMBINES - SELF PROPELLED (SP) OR PULL TYPE (PTO)

Years Life = 13
Annual Hours Use = 100, 150*, 200 Hours
Annual Repair Rate = 3% Replacement Cost

Combine Cylinder Width	Annual Hours Use	Current Replace Cost	POWER UNIT OR SP UNIT Fixed Cost	POWER UNIT OR SP UNIT Variable Cost	PTO MACHINE Fixed Cost	PTO MACHINE Variable Cost	TOTAL Machine Cost	Profit Margin 40% Var Cost + $7 Lab	Full Cost + Profit Basis for Custom Charge**			Market Rate Survey
		$	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	Ac/Hr	$/Acre	1982
POWER TAKE OFF	100				60.29		93.01		110.88		18.48	
44-50 IN CYLINDER	150	40000	12.56	12.16	40.19	8.00	72.92	10.86	90.78	6.00	15.13	
(Tractor HP = 120)	200				30.15		62.87		80.73		13.46	
LARGE PTO	100				88.93		134.67		155.93		18.34	
J.D.7721, IHC1482	150	59000	17.08	16.86	59.29	11.80	105.03	14.26	126.29	8.50	14.86	
(Tractor HP = 180)	200				44.47		90.20		111.47		13.11	
SP DIESEL	100		108.53				130.52		149.11		27.11	
45 INCH	150	72000	72.35	21.99			94.34	11.60	112.94	5.50	20.53	
(HP = 100)	200		54.26				76.25		94.85		17.25	
SP DIESEL	100		132.64				159.90		180.61		27.79	
50 INCH	150	88000	88.43	27.26			115.68	13.70	136.39	6.50	20.96	
(HP = 120)	200		66.32				93.58		114.29		17.58	
SP DIESEL	100		143.19				173.23		195.05		22.95	$12-15
60 INCH	150	95000	95.46	30.04			125.50	14.82	147.32	8.50	17.33	per
(HP = 140)	200		71.60				101.64		123.45		14.52	Acre
ROTARY TYPE	100		128.12				156.16		177.18		25.31	
(SMALL) TR75,	150	85000	85.41	28.04			113.45	14.02	134.47	7.00	19.21	
IHC1440 (HP = 150)	200		64.06				92.10		113.12		16.16	
ROTARY TYPE	100		135.66				165.38		187.08		32.01	
(MEDIUM) IHC1440,	150	90000	90.44	29.73			120.17	14.69	141.86	8.50	16.60	
TR85, ACN5 (HP = 175)	200		67.83				97.66		119.25		14.03	
ROTARY TYPE	100		170.33				206.38		230.60		24.27	
(LARGE) IHC1480,	150	113000	113.55	36.06			149.61	17.22	173.83	9.50	18.30	
TR95, ACN6 (HP = 185)	200		85.16				121.22		145.44		15.31	
ROTARY TYPE	100		188.41				230.66		257.36		24.91	
(LARGEST) ACN7,	150	125000	125.61	42.25			167.86	19.70	194.56	10.50	18.53	
WHITE9700 (HP = 250)	200		94.21				136.46		163.16		15.54	

* The 150 Hour Annual Use figure is typical.

** Full Cost + Profit Basis for Custom Charge includes Labor at $7.00 per Hour.

GRINDERS, MIXERS & DRYERS

Implement	Tractor HP	Current Replace Cost	POWER UNIT OR SP UNIT Fixed Cost	POWER UNIT OR SP UNIT Variable Cost	IMPLEMENT Fixed Cost	IMPLEMENT Variable Cost	TOTAL Machine Cost	Profit Margin 40% Var Cost + $7 Labor	Full Cost + Profit Basis for Custom Charge *			Market Rate Survey
		$	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	Tonne/Hr	$/Tonne	1982
TUB GRINDER	Life = 12		Annual Hours Use = 80				Annual Repair Rate = 3% Replace Cost					
15 Tons/Hour	80	13500	7.03	7.27	26.41	5.06	[illegible]	7.73	60.50	15.00	[illegible]	
25 Tons/Hour	140	20000	14.57	13.94	39.13	7.50	[illegible]	11.38	93.51	25.00	[illegible]	
PORTABLE GRINDER MIXER	Life = 10		Annual Hours Use = 80				Annual Repair Rate = 3% Replace Cost					
20" Screen	80	8500	7.03	7.27	18.22	3.19	[illegible]	6.98	[illegible]			$7-10 per Tonne
24" Screen & Bale Shredder	100	12000	11.30	9.84	25.73	4.50	[illegible]	8.54	[illegible]			
GRAIN DRYERS	Life = 12		Annual Hours Use = 200				Annual Repair Rate = 3% Replace Cost				Moisture Drop [illegible]	
RECIRCULATING BATCH												
Small (37 litres/hr)	40	10500	4.27	3.61	8.22	7.93	[illegible]	7.41	38.44 Tonne/Hr =		[illegible]	
Medium (46 litres/hr)	40	13000	4.27	3.61	10.17	9.85	[illegible]	8.19	43.09 Tonne/Hr =		[illegible]	
Large (64 litres/hr)	40	17000	4.27	3.61	13.30	13.71	[illegible]	9.73	51.62 Tonne/Hr =		[illegible]	
CONTINUOUS FLOW												$7-20 per Tonne
Small (90 litres/hr)	40	20000	4.27	3.61	15.65	19.28	[illegible]	11.96	61.76 Tonne/Hr =		[illegible]	
Medium (110 litres/hr)	40	24000	4.27	3.61	18.78	23.56	[illegible]	13.67	70.89 Tonne/Hr =		[illegible]	
Large (145 liters/hr)	40	35000	4.27	3.61	27.39	31.06	[illegible]	16.67	89.99 Tonne/Hr =		[illegible]	

* Full Cost + Profit Basis for Custom Charge Includes Labor at $7.00 per Hour.

FARM TRUCKS

Life = 15 Years
Annual Repair Rate = 3% Replacement Cost

Truck Size	Annual Hours Use	Fuel Use	Current Replace Cost	Fixed Cost	Variable Cost	TOTAL Truck Cost	Pofit Margin 40% Var Cost + $7 Lab	Full Cost + Profit Basis for Custom Charge *	Market Rate Survey
		litres/Hr	$	$/Hr	$/Hr	$/Hr	$/Hr	$/Hr	1982
GENERAL TRUCKING									
2 Ton	150 300 450	30.00	19000	17.92 8.96 5.97	12.60		7.84		$5 per Tonne
3 Ton	150 300 450	37.00	22000	20.75 10.38 6.92	15.39		8.96		
4 Ton	150 300 450	45.00	26000	24.53 12.26 8.18	18.64		10.26		$30 - 40 Per Hour
5 Ton Tandem	150 300 450	52.00	32000	30.19 15.09 10.06	21.74		11.50		

* Full Cost + Profit Basis for Custom Charge. Includes Labor at $7.00 per hour.

POINTS TO CONSIDER IN A CUSTOM HIRING AGREEMENT

Custom hiring is a business arrangement. As in all business arrangements, the agreement should outline the rights and duties of all the parties involved. A written agreement is advisable to avoid misunderstandings in case of a dispute. The following points should be considered in a custom hiring agreement.

1. **Operations:** The agreement should provide a description of the exact operations to be performed by the parties and the machines, materials and labor to be supplied by each party.

2. **Timeliness:** Significant losses can occur if an operation is not started or completed on time. To facilitate planning, a custom hiring agreement should include a schedule of operations for both parties. Such a schedule would be subject to weather conditions and crop maturity. Reasonable notice should be provided by each party when circumstances alter the schedule for operations.

3. **Rate Schedule:** The custom operator, for each operation to be performed, should stipulate his rate on the basis of acreage, time (week, day, hour) or total operation performed.

4. **Payment:** The agreement should stipulate the terms of payment for custom operations. The custom operator should bill the client on completion of each custom operation indicating the actual units (acres, hours, etc.) completed, the rate charged per unit, the total charge and the due date for payments.

5. **Down-Time:** The parties should consider a clause in the agreement, regarding responsibility for down-time as a result of machine breakdown.

6. **Termination:** The agreement should include a clause for a minimum period of notice for termination. A penalty should be stated for unjustified termination of the agreement.

7. **Liability:** The parties should consider a clause stipulating the responsibility for liability claims as a result of damage to personal property.

8. **Management:** The custom agreement should secure provisions that the custom operator will employ acceptable management practices in his operations.

For additional information and sample agreements for the above, refer to the publication "Custom Farming Agreement", Alberta Agriculture, Agdex 817-10.

MACHINERY COST WORKSHEET

Machine.....**Original Cost**.....**Annual Hours of Use**.....

Replacement Cost .....**Sale Value**.....**Years of Use**.....

FIXED COSTS (Calculated on Yearly Basis)

			Yearly Cost	Hourly Cost
1. Depreciation	= Replacement Cost - Cash Sale Value / Years of Use	$..... - $..... / .....Years	$ _____	
2. Investment Cost	= Original Cash Cost + Cash Sale Value X Interest Rate / 2	$..... + $..... / 2 X .....%	$ _____	
3. Insurance & Housing	= Original Cash Cost X 1%	$..... X .....%	$ _____	
4. TOTAL FIXED COSTS PER YEAR			$ ═══ (A)	
5. TOTAL FIXED COSTS/HOUR	= Total Costs/Year/Hours of Annual Use	$..... ÷ $.....hr		$ ═══ (B)

VARIABLE COSTS (Calculated on Hourly Basis)
(use following formulas if actual costs are not known)

1. Fuel Cost	= Litre/Hour X Price/Litre	..... X $..... X	$ _____	
2. Lubrication	= Fuel Cost X 15%	$..... X .....%	$ _____	
3. Repairs	= Original Purchase Price X Annual Repair Rate / Hours of Annual Use	$..... X .....% / .....hrs		$ _____
4. TOTAL VARIABLE COSTS PER HOUR				$ ═══ (C)
5. TOTAL VARIABLE COSTS PER YEAR	= Total Variable Costs/Hour X Hours of Annual Use	$..... X .....hr	$ ═══ (D)	

TOTAL COSTS PER YEAR (A+D) = $..... + $..... $ _____

TOTAL COSTS PER HOUR (B+C) = $..... + $..... $ _____

MACHINERY CUSTOM CHARGE WORKSHEET[1]

Operation ..... Power Unit ..... Implement(s) ..... Acres/Hour .....

FIXED COSTS PER HOUR[2]	Power Unit	Machine 1	Machine 2
A. Depreciation	$ _____	$ _____	$ _____
B. Investment Cost	$ _____	$ _____	$ _____
C. Insurance & Housing	$ _____	$ _____	$ _____
D. Total Fixed Cost (A+B+C)	$ _____ (P)	$ _____ (R)	$ _____ (S)
E. Total Fixed Machine(s) Costs (P+R+S)			$ _____ (E)
VARIABLE COSTS PER HOUR[3]			
F. Fuel Cost	$ _____		
G. Lubrication	$ _____	$ _____	$ _____
H. Repairs	$ _____	$ _____	$ _____
I. Total Variable Cost (F+G+H)	$ _____ (T)	$ _____ (U)	$ _____ (V)
J. Total Variable Machine Cost (T+U+V)			$ _____ (J)
K. TOTAL MACHINE COST PER HOUR (E+J)		$ _____ (K)	
L. LABOR COST PER HOUR		$ _____ (L)	
M. PROFIT MARGIN (20-50% of Variable Cost + Labor)		$ _____ (M)	
N. FULL COST + PROFIT (K+L+M)		$ _____ (N)	
O. TOTAL CHARGE/ACRE (N ÷ Acres/Hour)		$ _____	

1 Before using this worksheet, calculate the costs of each machine using the "Machinery Cost Worksheet".
2 Refer to Machinery Cost Worksheet and divide by annual hours of use.
3 Refer to Machinery Cost Worksheet.

FUEL CONSUMPTION FOR VARYING TRACTOR HORSEPOWER[1]

TRACTOR TYPE AND SIZE	AVERAGE DRAWBAR HORSEPOWER[2]		AV. FUEL CONSUMPTION[3] (Litres per Hour)	
	Diesel Tractors	Gasoline Tractors	Diesel Tractors	Gasoline Tractors
Two Wheel Drive PTO HP				
30 - 39	....	31.5	....	10.5
40 - 49	....	38.3	....	12.3
50 - 59	48.2	47.1	10.5	15.0
60 - 69	56.2	55.2	13.6	20.0
70 - 79	65.5	64.5	16.4	23.2
89 - 89	73.5	74.5	17.7	26.8
90 - 99	84.0	82.0	20.5	28.2
100 - 119	90.3	....	22.7	....
120 - 139	111.6	....	28.2	....
140 - 159	128.9	....	32.3	....
160 - 179	145.8	....	38.6	....
Over 180	148.9	....	39.1	....
Four Wheel Drive DBHP				
100 - 149	135.0	....	33.2	....
150 - 174	159.4	....	40.3	....
175 - 199	182.8	....	50.0	....
200 - 224	217.4	....	53.0	....
225 - 249	235.5	....	58.0	....
250 - 274	265.0	....	61.4	....
275 - 299	281.3	....	62.6	....
300 - 349 *	305.0	....	66.4	....
Over 350 *	385.0	....	92.4	....

* Includes only one tractor

NOTES ON FUEL CONSUMPTION TABLE

This data on fuel consumption for different sizes of tractors was calculated from the Nebraska Tractor Tests Reports. The fuel consumption figures are based on "75% of Pull at Maximum Power". These fuel consumption figures are for tractors under normal load in average field conditions. Fuel use per hour will be affected by:-

- load factor (75% is assumed in these estimates)
- engine RPM
- gear
- correct engine tuning

While these figures may be a good indication of fuel use per hour for a machine, fuel consumption per acre will be affected by the Field Efficiency related to each operation. Estimation of total fuel consumption should take this factor into account. Some factors that can significantly affect field efficiency include:-

- wheel slippage
- tire pressure
- tractor ballast
- depth of and sharpness of implement
- soil type and condition
- amount of turning required
- implement overlap in each pass
- down time to refill seed and fertilizer boxes

1 This data was summarized from "Nebraska Tractor Test Summary 1972 through 1981", The Grain Grower, Page 762 (UGG), April, 1982 and from 1980 - 1981, Agricultural Yearbook, A.S.A.E, May, 1980, pp 537-545.
2 Average Drawbar Horsepower for all tractors in each range.
3 Average fuel consumption for all tractors in each range.

MACHINERY COSTS ASSUMPTION GUIDE

MACHINE	A Depreciation Lifetime (Years)	B Annual Use (Hours)	C Annual Repair rate % orig.Cost	D Lifetime Repairs % orig.Cost	E Field Efficiency
Tractors	13	600	3%	120%	.....
Combines	12	150	3%	60%	60 - 80%
Cultivators	15	250	3-8%	120%	70 - 90%
Discers	15	150	3%	120%	70 - 90%
Rodweeders	15	100	2%	100%	70 - 90%
Seed Drills	15	100	2%	100%	65 - 80%
Harrows, Packers	15	40	2%	120%	70 - 90%
Sprayers	15	50	2%	80%	50 - 80%
Stone Pickers	15	40	2%	100%	50 - 80%
Swathers	15	100	3%	95%	70 - 85%
Mowers & Rakes	15	50	2%	100%	60 - 90%
Mower-Condtioner	15	50	2%	100%	60 - 85%
Forage Harvester	15	80	3%	80%	50 - 80%
Balers					
Standard	10	80	3%	80%	60 - 85%
Large Round	12	60	2%	60	60 - 85%
Grain Dryers	12	200	3%	...	.....
Loaders	15	40	2%	90%	.....

NOTES ON COLUMN HEADINGS

A. Estimated average number of years until a machine depreciates to 10% of original cash cost.

B. Estimated average annual farm use.

C. Estimates are based on average conditions and the indicated annual hours of use.

D. Total repairs as a percent of the original cash cost. Repairs are usually low in the first years before they begin to increase at an increasing rate as the machine wears out. These figures could be viewed as a maximum since they reflect high rates in later years.

E. Field Efficiency is a percentage estimate of the amount of time machinery is actually in use relative to the total time required to complete an operation (refer also opposite page).

ACRES PER HOUR

Acres per hour (or "Effective Field Capacity") can be calculated using the following formula:-

$$\text{Acres per hour (Effective field Capacity)} = \frac{\text{machine width (ft)} \times \text{speed (mph)} \times \text{field efficiency}}{8.25}$$

E.G. A 31' cultivator travelling at 5 m.p.h. operating at 80% field efficiency would have an effective field capacity of:-

$$\text{Acres per hour} = \frac{31 \times 5 \times .80}{8.25} = 15 \text{ ac/hr}$$

"MY EQUIPMENT COSTS"[1]

MACHINE TYPE	FIXED COSTS		VARIABLE COSTS		TOTAL COSTS	LABOR	PROFIT MARGIN	FULL COST + PROFIT
	Total	Per Hour	Total	Per Hour	Per Hour	Per Hour	Per Hour	Per Hour

[1] Costs for your own equipment can be calculated using the Worksheet on page 13.

METRIC CONVERSION TABLE

1 hectare (ha)	=	2.5 acres
1 kilometre (km)	=	0.625 miles
1 metre (m)	=	3.3 feet
1 centimetre (cm)	=	0.39 inches
1 kilogram (km)	=	2.2 pounds
1 tonne (t)	=	1.1 tons or 2200 pounds
1 tonne (t)	=	36.7 bu. of wheat
	=	45.9 bu. of barley
	=	64.8 bu. of oats
	=	44.1 bu. of rapeseed
1 litre (l)	=	0.22 gallons
1 kilowatt (kw)	=	1.34 horsepower
1 acre	=	.4 hectares
1 mile	=	1.6 kilometres
1 foot	=	.3 metres
1 inch	=	2.5 centimetres
1 pound	=	.45 kilograms
1 ton	=	.91 tonnes
1 bu. of wheat	=	27.3 kilograms
1 bu. of barley	=	21.8 kilograms
1 bu. of oats	=	15.5 kilograms
1 bu. of rapeseed	=	22.7 kilograms
1 horsepower	=	.75 kilowatts

1 kilogram per hectare = 0.9 pounds per acre (approximately)

1 pound per acre = 1.1 kilograms per hectare (approximately)

If a fertilizer recommendation is given in kilograms per hectare and the machine is calibrated in pounds per acre, set the machine at 10% less than the recommendation to obtain the desired rate.